BRASS FOREIGN BODY IN THE BRAIN STEM
A CASE REPORT*
IRVING J. SHERMAN, M.D.†
Bridgeport, Connecticut

(Received for publication September 22, 1958)

This case report concerns a 12-year-old boy who was ingenious enough to make a small brass model of a Revolutionary War cannon—and to find a friend whose chemistry set made possible the manufacture of gun powder.

On Nov. 25, 1955, a successful attempt to fire the cannon was made (Fig. 1). The very first charge of gun powder expelled the supporting brass rod from each side of the chamber of the cannon. One slug buried itself in the side of the house and the other slug (also shown in Fig. 1) entered the patient’s right temple. The patient was brought immediately to the Bridgeport Hospital.

Fig. 1. Cannon and brass slug.

Examination. There was a small puncture wound just above the right ear. The patient was semiconscious and had a left hemiplegia as well as right 5th and right 6th cranial nerve palsies. Roentgenograms revealed a cylindrical metallic body measuring approximately 8 cm. by 2 cm. and lying approximately 1 cm. posterior to the right of the clinoid process, 1 cm. to the right of the midline (Figs. 2 and 3).

1st Operation. Debridement of the wound tract was carried out revealing a considerable amount of subdural blood and intracerebral clot. The tract of the wound was found to pass caudally through the right temporal lobe to the right petrous apex. However, the tract could not be followed into the petrous bone nor could the foreign body be visualized.

Course. The patient tolerated this surgery well and within a few hours had a 30 per cent improvement of his left hemiplegia. However, he remained somewhat drowsy, restless, uncooperative and incontinent. One day after operation roentgenograms revealed that the inferior pole of the foreign body had shifted approximately 2 mm. laterally. Attempts to move the foreign body further laterally with the help of gravity and shaking of the boy’s head failed.

Meanwhile, it had been definitely ascertained that the metallic foreign body

* Presented before the Neurosurgical Society of America, January 1957.
† Address: 2660 Main St., Bridgeport 6, Connecticut.

483
was made of brass. Consultation with other neurosurgeons and with the American Institute for Research in Brass and Copper failed to yield any information as to how a large brass foreign body would be tolerated in the substance of the brain. [One and one-half years later, Fischer et al. 1 reported that the cat's brain tolerated copper very poorly, necrosis and cyst formation resulting.] Chemists at the Bridgeport Brass Company indicated that prompt formation of copper chloride was to be expected, and that this was not an inert chemical. As brass is composed of copper and zinc, with a sprinkling of other minerals, generation of electrical activity also seemed possible. These considerations, together with the patient's failure to improve, led to the decision that an attempt should be made to remove the foreign body.

2nd Operation. This was carried out 10 days after the injury. The metallic foreign body was found to lie in a cyst, approximately 2½ cm. in diameter, in the brain stem. The almost invisible wound of entrance, at the most anterior portion of the cyst, was between the posterior cerebral artery and the superior cerebellar artery. The lining of the wall of this cyst and the adjacent arachnoid were stained a greenish tint. Green deposits of copper chloride were grossly visible on the surface of the metallic foreign body. This operation was carried out through the same right subtemporal craniectomy wound through which the original debridement had been performed. It was necessary to split the tentorium. A portable roentgenographic study with a silver-clip marker placed on the surface of the brain stem aided the search for the foreign body.

Course. The patient tolerated this procedure well and improved after an additional 4-day period of peculiar restlessness, uncooperativeness and incontinence. The left hemiplegia improved rapidly and the patient was discharged 8 days after his second operation, ambulatory with a limp, and using the left hand fairly well. The right 5th nerve palsy showed a slight degree of recovery. The right 6th nerve palsy was unchanged.

The patient did very well during the following month with regard to the left hemiplegia and with regard to his behavior. However, 2 months after his injury, injection of the conjunctiva of the right eye appeared. This was rapidly followed by the development of a proptosis (Figs. 4 and 5), and a bruit could then be heard in the right frontal and right temporal areas. This bruit was synchronous with the pulse and there was little doubt that the patient had an arteriovenous aneurysm. On Feb. 1, 1956 this was confirmed by angiography.
3rd Operation. Ligation of the right internal carotid artery in the neck was performed on Feb. 1, 1956.

Course. There seemed to be some improvement the first day, but a few days later the proptosis was obviously worse than ever.

4th Operation. On Feb. 6, 1956, the right subtemporal craniotomy was again reopened and the internal carotid artery was occluded intracranially with a tantalum clip. At operation enlargement of the right cavernous sinus so as to encroach on the floor of the middle fossa was evident.

Course. Immediately after this intracranial occlusion of the internal carotid the patient did very well, his vision remaining normal, the proptosis and chemosis receding. However, on the third postoperative day vision in the right eye became grossly impaired. The patient did not lose all vision, however, and soon there was gradual improvement. Subsequently vision in the right eye has returned to normal and the right 6th nerve palsy has cleared. The patient is still troubled slightly by diplopia in certain fields of vision. The bruit has disappeared as have the proptosis and injection of the conjunctiva. The mild diplopia and a persistent slight hypesthesia in the distribution of the right 5th cranial nerve are now the only residuals apparent more than a year after the injury.

Comment. It is of interest that the brain stem has tolerated this gross damage so very well, and that the chemical composition of brass is such as to lead to cyst formation in the brain (in a period of 10 days in this case).

One further point of interest is that within 1 month of the patient's injury a trophic ulcer developed in the right upper lip (Fig. 5) and that this ulcer did not heal until 1½ years later. As such trophic lesions are not observed after section of the 5th nerve, it seems likely that this effect may have been caused by damage to the nucleus of the 5th nerve.

SUMMARY

A case of large brass foreign body in the brain stem is reported. Subsequent development and treatment of an arteriovenous aneurysm is mentioned. It is of interest that apparently brass is poorly tolerated in the brain because of chemical activity and prompt cyst formation.

REFERENCE